

Title (en)
UNIPOLAR QUANTUM CASCADE LASER

Title (de)
UNIPOLARER QUANTENKASKADENLASER

Title (fr)
LASER UNIPOLAIRE A CASCADE QUANTIQUE

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Abstract (en)
[origin: WO03023909A2] The invention relates to a unipolar quantum cascade laser comprising a plurality of adjacent semiconductor multilayer structures arranged in a periodic sequence and through which an electron flow can be applied by providing at least two contact points. Said structures have an optically active area comprising at least one quantum film structure in which there are at least one upper energy level and one lower energy level for the electrons, between which light emitting electron transitions take place. Said structures also have a transition area comprising a plurality of semiconductor layers through which electrons from the lower energy level of the optically active area reach the upper energy level of an optically active area of an adjacent semiconductor multilayer structure, which is directly adjacent to the transition area in the direction of electron transport, wherein the electron transitions and the electron transport takes place solely in the conduction band of the semiconductor multilayer structures. The invention is characterized in that at least one blocking layer is provided in the semiconductor multilayer structure, said layer having an uppermost conduction band edge potential that is higher than the uppermost band edge potential of all the other semiconductor layers contained in the semiconductor multilayer structure.
[origin: WO03023909A2] The invention relates to a unipolar quantum cascade laser comprising a plurality of adjacent semiconductor multilayer structures arranged in a periodic sequence and through which an electron flow can be applied by providing at least two contact points. Said structures have an optically active area comprising at least one quantum film structure in which there are at least one upper energy level and one lower energy level for the electrons, between which light emitting electron transitions take place. Said structures also have a transition area comprising a plurality of semiconductor layers through which electrons from the lower energy level of the optically active area reach the upper energy level of an optically active area of an adjacent semiconductor multilayer structure, which is directly adjacent to the transition area in the direction of electron transport, wherein the electron transitions and the electron transport takes place solely in the conduction band of the semiconductor multilayer structures. The invention is characterized in that at least one blocking layer is provided in the semiconductor multilayer structure, said layer having an uppermost conduction band edge potential that is higher than the uppermost band edge potential of all the other semiconductor layers contained in the semiconductor multilayer structure.

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